Evaluation of card-based versus device-based reminiscing using photographic images

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EVALUATION OF CARD-BASED VERSUS DEVICE-BASED REMINISCING USING PHOTOGRAPHIC IMAGES

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Reminiscence activity is commonplace as an activity that is widely recognized as beneficial to people with dementia. It can offer alleviation of the burden of care for those who look after people with this disease. In reminiscence activities, people may use items including photographs representing their lives, in some form. Reminiscence systems are the use of technology to support reminiscence work. This paper describes a study that carried out an evaluation of card-based versus device-based reminiscing using photographic images. The outcome of the study demonstrated no difference between traditional and device-based reminiscing of photographic images, indicating no barriers to the use of systems for reminiscing activities.

Keywords: Reminiscence Systems, Reminiscing, Assistive Technology, Reminiscence Therapy, Reminiscence Work

Introduction

The response at policy level to the demographic ageing or the "greying" of our populations in developed economies is a move towards self-management where possible, as well as supporting "ageing in place" where the older person can receive care at home, in the supportive circle of family and friends. However, many of these people may not have opportunities for social contact, even at home, and as such, potentially face a degree of social isolation. The paper outlines work in support of reminiscing, which is recognized as an activity that provides benefit to, for example, people with dementia. The activity also is of benefit as a therapeutic intervention to this group and is recognized as beneficial also to the wider, older population. As we age, we gather a large number of life experiences, many of them signifying important life stages – for example, as our family grows, as we impact on the world, and as the world impacts on us. An old photo, of sentimental value, can mean everything to a person, becoming imbued with tremendous significance and often-talismanic importance. These artefacts, whether a location, person or event, or indeed a photo of such an artefact, become the stuff of reminiscing, fuelling what is viewed as a therapeutic process, that, when managed, offers benefits (Koretsky, 2001; Sandoz, 1996) but can reinforce feelings of isolation and depression when unmanaged. As people age, they also increasingly face old age alone, especially in developed economies, as the demography of the post-war (1939-45) period is realized in societies today. The baby boomers of the post-war period are now at or past retirement age, and this increase in numbers of older people results in a significant strain on social and health services. It is projected that by 2025 over 70% of UK households will comprise of people living alone, where a majority will be elderly people. This large body of people, each of whom may have gathered many sets of memories as photographs, has no real facility to use material for reminiscing or share these and to enjoy the therapeutic benefit arising from sharing.

Reminiscing includes a range of activities and traditional tools aimed at stimulating thoughts, feelings and memories of times gone by. For example, these could

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be recalling significant cultural issues, events, old friendships or places. Reminiscing can help older people to improve their own health and wellbeing. In scientific literature, the impact of reminiscing therapy as an intervention has been demonstrated for a range of populations, but primarily for people with dementia.

In this paper, the issue of reminiscing is explored. As a social phenomenon, reminiscing offers social benefits and brings communities together while discussing personal and historical issues of relevance to the participants. However, as, for example, older people may lead increasingly isolated lives, there is a risk that they are excluded from the opportunities to engage socially in activities and acts such as reminiscing, without the effective employment of technology to support the acts. The key question being asked is should the act of reminiscing be supported using information and communications technology (ICT)?

Reminiscence is defined and explained in the paper, in particular from a perspective of the work carried out supporting people with dementia and their carers. Reminiscence systems are then defined and explored and in this section, particular attention is given to commercially available systems including social networking-based systems. The following section examines older people as users of ICT technology and services based upon this technology. The particular scope of studies in the realm of reminiscence systems is then outlined and the comparative evaluation study is then described, encompassing method, study and results. The key question of reminiscence being supported by technology is examined in the study, where photographic images are used by the study group for reminiscing with some participants viewing them as traditional photographs mounted on cards, while others view the images using a touch screen iPad device. Another aspect of the research was to examine if different types of images were treated differently in the study, whether on a device or mounted on card. The research question being examined was whether "personal" images belonging to the participant would be viewed for a longer time than general images, such as "generic" images of the participants' home area or images reflecting some "shared experience" such as a beach holiday. The paper concludes by examining the results of the study.

Reminiscence

Reminiscence has been defined as a "process of thinking or telling others about one's past experiences" (Cappeliez et al. 2005). As a therapeutic intervention, reminiscence is "using the recall of past events, feelings and thoughts to facilitate pleasure, quality of life, or adaptation to present circumstances" (Dochterman and Bulechek, 2003). Reminiscence therapy is generally based one of two theoretical perspectives – Erikson's theory of psychosocial development or Atchley's continuity theory. Erikson's theory emphasises "achievement of ego-integrity and a sense that one's life has meaning and significance, which can be fostered through reminiscence" (Bohlemeijer et al. 2005; Wang, 2005). Continuity theory, on the other hand, "emphasises adjustment by clients to maintain continuity in internal (self concept) and external (social behaviour and social interaction) structures" (Atchley, 1989). Reminiscence is seen as an attempt to maintain continuity between past and present through recall of "familiar knowledge, skills and strategies" (Lin et al. 2003). Reminiscing includes activities and the use of traditional prompts aimed at stimulating feelings and memories; e.g., the use of multi-sensory triggers to stimulate recall (Gibson, 2004). The majority of research in reminiscence systems has been carried out to assist people with dementia and related illnesses (Astell et al. 2008; Sarne-Fleischmann and Tractinsky, 2008). The impact of reminiscing therapy as an intervention has been examined; e.g., Wang (2005) demonstrated how it was valuable and beneficial to people with dementia although Woods et al. (2005) found inconclusive evidence of the efficacy of reminiscence therapy for dementia in a Cochrane Review. However, it has been shown that reminiscence in general, especially life review, are potentially effective methods for the enhancement of psychological well-being in older adults (Bohlemeijer et al. 2007) and the therapeutic potential of place-based reminiscence has been proposed as an avenue in enhancing the quality of life for older people in long-term care facilities (Chaudbury, 2003), sometimes using remote reminiscing facilities (Kuwahara et al. 2006).

Reminiscence Systems

The easiest way in which to describe reminiscing and how ICT supports reminiscing activities is to review some of the systems from research literature as well as systems in use. Reminiscence systems have been defined as the use of technology to support reminiscence work (Mulvenna et al. 2009). The use of multimedia in reminiscence systems was arguably the first stage in the growth of research in reminiscence systems supported

by ICT, and there are a significant number of research projects and publications highlighting such work (Newell et al. 2002). It is natural, perhaps, that reminiscing work, which uses visual and hearing senses (as well as other senses) could be enriched with multimedia material encompassing photographs, videos, audio recordings, and music, as well as historical material from newspapers, for example. The multimedia paradigm also lends itself to extending the concept of memory books, used in traditional reminiscence work, where a caregiver or family member compiles a personal scrapbook with images and pictorial mementos of a person's life. Using multimedia, the reminiscence systems can animate the material, thus making it more attractive and attention holding than a paper-based scrapbook. However, since the process of creating a memory book is itself a process rich in reminiscing opportunities, care must be taken not to replace this type of work with a more mundane and less user-centered multimedia authoring process. One such example of an application that has been designed to support reminiscing is MemoryMiner[1]. This is a multimedia application where photographs and other visual material can be added to a repository, annotated and then published to the Internet where further annotations can be made to the material.

In order to make reminiscence systems as accessible as possible for reminiscing by people (and their caregivers, if relevant), the interface of such systems must be as user friendly as possible. This is particularly important where the user is not normally a computer user and/or for when the system has to provide cognitive support, for example, to people with dementia. Touch screen devices are becoming increasingly used in reminiscence systems for people with dementia as the primary mode of interaction, obviating the need for mouse and keyboard combinations. One example of such a device is the CIRCA system (Astell et al. 2008). Touch screen devices, used as a direct input device, have been highlighted as requiring little or no training for users (Pak et al. 2002) and offer a "supportive interaction environment" for people with dementia and their caregivers (Astell et al. 2010a).

Another trend is the increasing use of the Internet and core "platform" services from companies such as Facebook[2] and Google. These services are popular with users and one of the most popular uses is the sharing and annotation of personal photographs and videos, especially amongst younger users. This user-generated content is becoming a significant component of all Internet content, and it can be argued that this content, on these platforms, will become the destination that people will go to in the future when they want to reminisce. One such system used for reminiscing and recall of past events was used to engage people in reminiscing activities using e-mails linking to social media content. The research found that users valued the system and that prompts with images interestingly drew more responses but less thoughtful ones than textual prompts (Cosley et al. 2009).

In terms of social media, existing social networking sites such as Facebook can support reminiscing interactions using specialized applications or "apps." There are also emerging social network sites that cater specifically to older people. These include Sagazone[3] and Finerday[4] in the UK. It is unclear if they support specific reminiscing activities, but a part of their attraction is in bringing older people together in a social network, and supporting their interactions. While not explicitly supporting reminiscing, the MyHeritage[5] site is a social networking application that is strongly orientated to linking family members in support of sharing experiences. In 2009, it held over 550 million individual profiles, over 14 million family trees and 81 million photographs.

Older People as Users

The number of older people is increasing rapidly in coming years, and reminiscing activities offer a social benefit to this group of older people as they age. Technology continues to be adopted and utilized across many areas of society and there is evidence of continued uptake of ICT by older people to assist them in their daily life activities. Therefore, it is valid to take a position that the act of reminiscing can be supported by ICT, and that using ICT to support and extend the capabilities of reminiscing activities offers a wide social benefit.

However, older people's attitude to ICT is different than the attitude of the wider population and is widely divergent from the attitude of the technologically savvy younger generations. In a 2006 research report on the attitude of older people to TV, radio, the Internet and mobile/portable devices, the majority of older people were classified as reluctant participants, that is, "abstainers" or "resistors," where around 74% of over people aged over 65 were either resistors (32% c/f 21% of UK adults) or abstainers (42% c/f 11% of UK adults)

[1]http://www.memoryminer.com/
[2]http://www.facebook.com/apps
[3]http://www.sagazone.co.uk/
[4]http://www.finerday.com/
[5]http://www.myheritage.com/

(Thickett, 2006). Of course, while the majority of older people may be characterized as resistors or abstainers of technology, older people are also embracing some technologies such as digital cameras. Using digital devices with their computers can eliminate many of the issues with traditional photograph storage and use, can make indexing and finding particular images much simpler, and can facilitate sharing of such media much more easy to achieve. As well as having differing attitudes towards technology and technology use compared to the wider population, older people may also have issues with usability and accessibility arising from the impact of age on their senses, primarily on hearing (hearing loss), eyesight (decline in amplitude for ocular accommodation) and cognitive abilities (decline in power of recall, for example), but also on physical dexterity, where, for example, grip strength declines with age. The number of people suffering from chronic diseases increases with age and many of these diseases impact on the ability of a person to use a particular modality of interaction with technology; for example, a person with Parkinson's disease, which causes tremors in hand movement or a slowing of physical movement in general, may not be able to interact well with a touch screen interface. There is also a significant difference between the youngest old (55+) and the oldest old (80+) across these three areas of attitude towards technology, age impairment of senses and cognitive and physical ability, and impairment due to the impact of chronic disease.

If the reminiscing act is supported by technology, then how can it support this group of people, each of whom are old but all have very different needs, requirements and attitudes due to their particular situation? What design decisions would need to be taken for a reminiscence system in order to accommodate such different needs? For example, in the CIRCA system (Astell et al. 2008), designed for people with dementia, the system has been designed to be "failure-free," meaning that there is no obligation for the user to complete any task or to navigate to a particular screen. CIRCA was designed to provide an "intuitive, expansive and fail safe reminiscence experience, utilizing contemporary computer touch screen technology and interactive media design to assist people with dementia and their caregivers and relatives in prompting conversation in one on one or group situations" (Gowans et al. 2009).

The Potential Support Ratio (PSR) is the ratio of the number of 15-64 year olds who could support one person 65+ (retired). In the UK in 1950 the PSR was 12:1, in 2000 9:1 and it is projected to be 4:1 by 2050 and 2:1 in the developed world (United Nations, 2002). There is also, then, an impending crisis in terms of the burden facing formal and informal (families, neighbors and friends) caregivers. The acts of reminiscing, supported using ICT, must also then support the caregiver of the older person, if necessary, and alleviate their care-giving stress or burden. This is particularly important as the number of people with dementia, estimated at 35.6 million people worldwide, is forecast to be 65.7 million in 2030 rising to 115.38 million in 2050 (Prince and Jackson, 2010).

In summary, older people as users are a complex, heterogeneric group, with different needs and characteristics, where physical, cognitive and sense impairment is typically accelerating in old age, where propensity to suffering from chronic disease is increasing, and critically, where the number of caregivers available to support older people is expected to decrease.

Scope of Studies for Reminiscence Systems

We believe that there are three main modalities of use for reminiscence systems. Firstly, the use of a reminiscence system by an individual; secondly, more than one person (may be a person and their caregiver, for example) sharing reminiscences in the same physical space; and thirdly, shared reminiscing where people are physically remote from each other but inter-connected by the Internet. In order to explore how the reminiscing act may be supported by ICT in these three modalities, several experiments have been designed. The methods for these are set out below, and broad topics include:

- Examine act and activities of reminiscing, in particular, our understanding of reminiscence;

- Explore the affordances of existing artefacts used in reminiscence, and the way such artefacts are used in conversation;

- Carry out ethnographic work with older people;

- Establish reminiscence needs identification for older people;

- Develop a user-friendly visual computer system designed to be used by older people for purposes of reminiscing;

• Develop evaluation frameworks using WHO QOL and/or PIADS (Demers et al. 2002) for system in use, as appropriate;

• Assess value of different types of multimedia information (photographs, film, generic media, person-specific media, or "shared experience" media); and

• Evaluate ease of organization and change of media by older people, people with dementia and caregivers.

Research has shown that the function of photographic-based images as memory aids, or as stimuli for reminiscing, can be placed in the context of the narratives that can be constructed around the image (Wright, 2010). Personal memory that relates to cultural memory should be considered, such as how the "objects of memory" can be drawn upon and how they are recounted.

In this paper, the first modality of use is examined in our study in the following section, which compares how older people reminisce using ICT devices, as well as traditional card-based images.

Study and Methods

The study was designed to explore how older people use technology for reminiscing. Research, discussed earlier in this paper, outlined how technologies are being used for reminiscing activities, in particular for people with dementia. In our small study, we wanted to see if there was any significant difference in how people reminisced with and without technology to support the reminiscing process. In order to test this question, participants in the study were randomly allocated to reminisce using either a device (an iPad) or more traditional images, on cards. Therefore, the overall aim of the study was to examine the attitudes of older people in using a device to reminiscence as opposed to a card-based approach. The study measured the impact of card- versus device-based reminiscing using the amount of time spent with each image. The small scope of the study made it difficult to evaluate more complex measures of impact.

Another aim of the study was to see if the different types of images made a difference in reminiscing. These three types of images were personal images belonging to the participants, generic images of life events and shared experience images. For example, a generic image may be an image of musical instruments, a shared experience image may be a photograph of people at a dance hall in 1950's Ireland, while an example of a personal image in this context may be a photograph taken at a dancehall, involving the actual participant. The rationale for examining if there was a difference in how people treated different types of images was founded on recent research, suggesting that "personal items, which have a certain story and set of information attached to them, may limit people's reminiscing to recollection of this information, making it more of a memory test than enjoyable social activity. By contrast, generic items, which have no single story attached, may spark off different recollections in different people, thereby encouraging the sharing of stories and social reminiscing" (Astell et al. 2010b). This recent research related to people with dementia and we wanted to see if there were any indications that older people generally would treat different types of images differently. The shared experience type of image was, in effect, a kind of generic image, designed to highlight people working or playing together.

The inclusion criterion for the study was older people over 55 years of age and normally under 85 years of age in 2010. This included people born between 1925 (for 85-year-olds) and 1955 (for 55-year-olds). Participants were recruited from two locations (Newtownabbey and Newry) in Northern Ireland to reflect a mix of urban and rural dwellers. There were 19 participants in total, with an average age of 71. The oldest participant was 85 and the youngest was 62. Seven of the participants were male.

The participants were informed that the study would help to develop the understanding of computer technology in the area of reminiscence and life story work.

The study divided the participants into two groups, the control group using photographs mounted on cards and those using a device. The study control group used traditional photographs, mounted on card (card-based), while the device group used Apple® iPad® devices with touch-screen navigation of photographs (device-based). The allocation of devices and photo cards to participants was randomized within each location.

In the study, each participant was presented with fifteen photographic images in random sequence, either on the device or mounted on card. The fifteen photographs were drawn equally from personal, shared experience and generic photographs, that relate to when the participant was 18-40 years old, therefore, photographs from

1943 (age 18 for people born in 1925) to 1995 (age 40 for people born in 1955) were used.

In order to prepare for the study, there was one initial group meeting at each location. At this meeting each participant met with the fieldwork supervisor who explained the study to all those participating. Informed consent was obtained from the participants and all relevant questions, queries and concerns were answered. At this initial meeting participants also got the opportunity to become familiar with the hand held device. The device was passed from one participant to another, supervised and supported by the researchers pointing out features of the device, in particular the use of the application designed for the study, displaying sample photographs from Northern Ireland. Care was taken to ensure that each participant then used the device on their own browsing through the photographs.

The fieldwork supervisor asked the participants to consider five images from their personal photograph record that are of personal significance to their lives. The specific wording was to "consider five images that are personally important within your own life, which trigger memories for you." This initial meeting was also an opportunity for interaction with the participants to help guide the selection of the generic and shared experience images.

At a second drop-in meeting at each location, the five personal images selected by the participants were scanned and immediately returned to the participants. The fieldwork supervisor also carried out a pre-study survey with each participant to gauge what images would be appropriate for use as generic and shared experience images, and from this, culturally relevant generic and shared images were selected to avoid presenting an image with which the participant had no interest. At this meeting, the fieldwork supervisor also finalized the schedule of individual meetings.

In the study itself, each participant sat with the facilitator and the participant held the cards or device and decided when to move to the next photograph. Forty-five minutes was set aside for study, but in the event no participant exceeded this time period. The facilitator, who remained the same for all 19 engagements, encouraged each participant to lead their session and invited him or her to tell their story.

After the study, a post-study questionnaire was used to gain feedback from participants on the study.

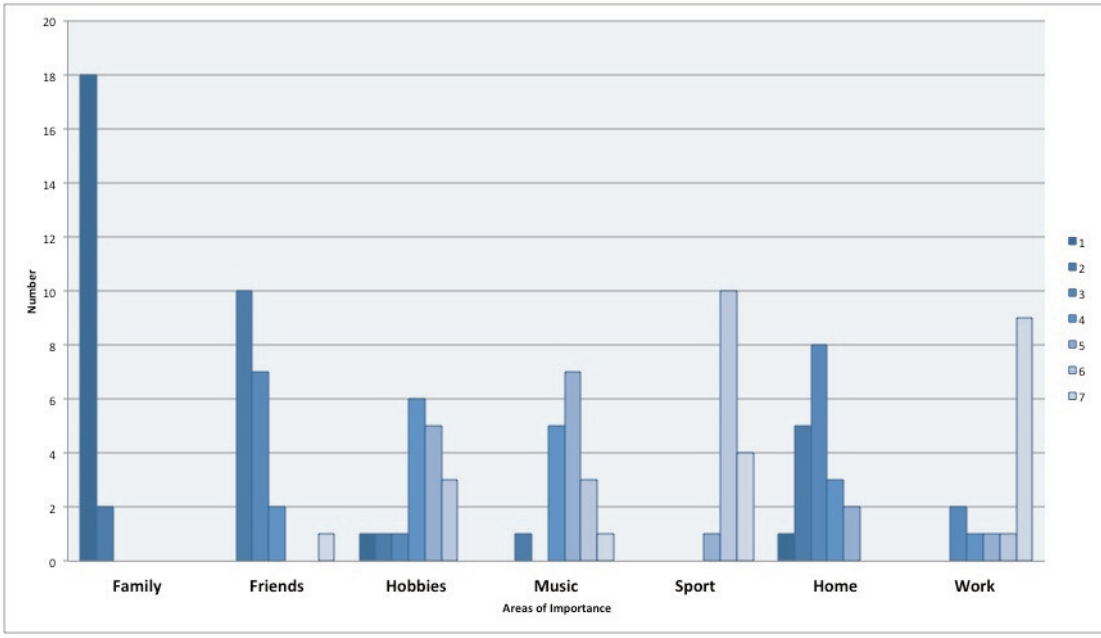

Figure 1. Pre-study Questionnaire on what is important in life.

Results

The pre-study survey asked the participants to explicitly rate what was important in their lives. In Figure 1, each of the following areas were rated from 1-7 on a Likert scale by the participants where "1" equalled important and "7" equalled un-important – family, friends, hobbies, music, sport, home, and work. The responses were then summed. The figure shows that, not surprisingly, the majority of people rated family as very important, with friends, then home ranking highly. This information was used to guide image selection.

A summary of the results of the average time (in seconds) spent by the participants on the image types, divided by locations (A and B) and whether they used a device or card is presented in Table 1.

Table 1
Time spent viewing photographic images (seconds)

	A	B	A	B
	Card		Device	
Generic	115	128	83	93
Shared	127	130	91	82
Personal	114	137	87	112

The data shows that, regardless of location, participants, on average, spent longer viewing photographs that were mounted on card than those on devices, for each of the different photograph types. In terms of differences between the types of photographs, while people spent slightly longer on average looking at personal images, no statistically relevant difference in the durations of viewing between any of the types of photographs (personal, generic, or shared experience) was found.

The results of the post-participation survey provided interesting views on perceptions of card versus device-based photograph reminiscing.

Table 3 shows that almost 80% of the participants found photographs to be emotionally moving.

When asked about their attitude towards card-based and device-based reminiscing, there was a broad range of comments, supportive of both cards and device.

Table 2
Attitudes to reminiscing with photographs

	n	%
Frequently reminiscence	10	53
Occasionally reminiscence	3	16
Not much reminiscence	6	32

Table 3
Attitudes to photographs

	n	%
Yes, I find photos moving	15	79
No, I don't find photos moving	4	21

Participants liked that the device was "Easy to use, tidier than paper," "Images don't get destroyed by handling," "Kept all images together," "Ease of use, image quality," "Ease of use," "Exciting," and commented "It is immediate," and "Very handy and quick." They disliked "Holding it," and commented "Very cold," "Left arm weak after break," and "Sensitive screen initially."

In terms of traditional images, the participants said they liked that "Cards can be handled around friends," "Could hold it in any hand," "Photographs are handy," "Handle images and look at full image closer," "It is more personal," "Being able to hold them," and "Not great with new technology." They disliked that "Traditional images are almost obsolete, everything now is CD," "Would like to try device also."

Discussion

This paper has described reminiscence, and how ICT can support the activities of reminiscing using reminiscence systems. It has provided a review of related work in the area of reminiscence systems, including commercial systems. The different types of technology support-

ing reminiscence work are described from the use of multimedia and touch screen technology to the growing importance of user-generated content and Internet-connected systems for reminiscing.

No significant issues in using devices for reminiscing were identified, and the study has shown that the participants had positive expectations of using either cards or devices for reminiscing. Participants perhaps enjoyed the novelty of using a device, even though the study sought to offset this intrinsic haptic reward (the fact that some things feel good when we touch them) by providing familiarization sessions for the participants to use the device.

Participants took longer on average interacting with the photographs mounted on card than for device-based photographs. However, perhaps the most important outcome of this study was that the participants did not reject the device-based reminiscing; the results from the surveys indicate that they enjoyed using the device.

When designing the study, it was felt that the participants would relate more strongly to images of their children, for instance, than to generic or shared experience images that did not have a personal family member included. However, a result that was unexpected was that there was no difference in how the participants viewed the three types of images (personal, generic and shared experience). There was also no evidence that participants spent longer viewing and discussing images that were not personal as suggested by Astell and colleagues (2010b).

The benefits in developing support for reminiscence using technology are that such systems offer advantages in ease of use, sharing of photographs and other media, as well as alleviating the burden of care with informal or formal caregivers, if appropriate. People may use devices such as the iPad® to communicate, play games, and browse images and videos from their own chair in their homes. The risks in adopting such technologies are that the essence and richness inherent in such a human activity as reminiscing are lost in translation, and that older people are expected to use technology as a proxy for interaction with other people including family and friends for social visits; and carergivers, for medication and home care support.

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